

In re Patent Application of

JENKINS et al.

Serial No. 10/549,817

Filed: September 19, 2005

Title: OPTICAL WAVELENGTH DIVISION MULTIPLEXER/DEMULTIPLEXER DEVICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences



Atty Dkt. SCS-124-1134

C# M#

Confirmation No. 3760

TC/A.U.: 2883

Examiner: J. Blevins

Date: October 9, 2008

Mail Stop Appeal Brief - Patents

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

☐ **Correspondence Address Indication Form Attached.**

☐ **NOTICE OF APPEAL**

Applicant hereby **appeals** to the Board of Patent Appeals and Interferences
from the last decision of the Examiner twice/finally rejecting
applicant's claim(s).

\$540.00 (1401)/\$270.00 (2401) \$

☒ An appeal **BRIEF** is attached in the pending appeal of the
above-identified application

\$540.00 (1402)/\$270.00 (2402) \$ 540.00

☐ Credit for fees paid in prior appeal without decision on merits

-\$ ()

☐ A reply brief is attached.

(no fee)

☐ Petition is hereby made to extend the current due date so as to cover the filing date of this
paper and attachment(s)

One Month Extension \$130.00 (1251)/\$65.00 (2251)
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Three Month Extensions \$1110.00 (1253)/\$555.00 (2253)
Four Month Extensions \$1730.00 (1254)/\$865.00 (2254) \$

☐ "Small entity" statement attached.

Less month extension previously paid on

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TOTAL FEE ENCLOSED \$ 540.00

☒ **CREDIT CARD PAYMENT FORM ATTACHED.**

Any future submission requiring an extension of time is hereby stated to include a petition for such time extension.
The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, in the fee(s) filed, or
asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this
firm) to our **Account No. 14-1140**.

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Signature: 



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
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APPEAL BRIEF

On Appeal From Group Art Unit 2883

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APPEAL BRIEF

Sir:

I. REAL PARTY IN INTEREST

The real party in interest in the above-identified appeal is QinetiQ Limited by virtue of an assignment of rights from the inventors to QinetiQ Limited recorded September 19, 2005 at Reel 17859, Frame 782.

II. RELATED APPEALS AND INTERFERENCES

There are believed to be no related appeals, interferences or judicial proceedings with respect to the present application, other than the two previously

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filed Pre-Appeal Brief Requests for Review filed on September 6, 2007 and July 9, 2008, respectively.

III. STATUS OF CLAIMS

Claims 1-6, 12-17, 19, 21-25, 27 and 30 stand rejected, with claims 7-11, 18, 20, 26, 28, 29, 31 and 32 having been cancelled without prejudice. The Examiner contends that with respect to claims 1-6, 12-14, 17, 19, 22, 23 and 30, those claims are unpatentable under 35 USC §103 over Tu (U.S. Patent 6,219,470) in view of Miura ("Modeling and Fabrication of Hollow Optical Waveguide for Photonic Integrated Circuits"). Claims 15 and 16 stand rejected as obvious over Tu/Miura in view of Bestwick (U.S. Patent 6,101,210). Claim 21 stands rejected over Tu/Miura in view of Kinoshita (U.S. Publication 2002/0191907). Claims 24, 25 and 27 stand rejected as obvious over Tu/Miura further in view of Okayama (U.S. Patent 6,097,517). The above rejections of claims 1-6, 12-17, 19, 21-25, 27 and 30 are appealed.

IV. STATUS OF AMENDMENTS

No further response has been submitted with respect to the 4th and non-final Official Action in this application mailed April 9, 2008 (Paper No. 20080325) other than the filing of the above two Pre-Appeal Brief Requests for Review noted above which decisions were mailed October 11, 2007 (re-opening prosecution)

and September 9, 2008 (forwarding to the Board of Patent Appeals and Interferences).

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Appellants' specification and figures provide an explanation of the claimed invention set out in independent claims 1 and 30, with each claimed structure addressed as to its location in the specification and in the figures.

“1. An optical wavelength division multiplexer/demultiplexer device [multiplexer 2 shown in Figure 1 and discussed on page 11, lines 27-32 and elsewhere in the specification] comprising:

a substrate [substrate 6 shown in Figures 1 & 2 and discussed on page 11, lines 28-30, and page 13, lines 22-24, respectively, and elsewhere in the specification] having a plurality of wavelength selecting filters [filters 26, 28, 30, 32, 34, 36 shown in Figure 1 and discussed on page 12, lines 6-7 and filters 26, 28, 30 shown in Figure 2 and discussed on page 13, lines 22-24 and elsewhere in the specification], said filters being arranged to provide conversion between a combined beam [light beam 8 having wavelengths λ_1 - λ_6 shown in Figure 1 and discussed on page 11, lines 30-32 and elsewhere in the specification] comprising a plurality of wavelength channels and a plurality of separate beams each comprising a subset of said plurality of wavelength channels [individual beams λ_1 ,

$\lambda_2, \lambda_3, \lambda_4, \lambda_5, \lambda_6$ shown in Figure 1 and discussed on page 12, lines 13-25 and elsewhere in the specification], and

hollow core waveguides [waveguides 4 shown in Figure 1 and discussed on page 12, lines 13-25 and elsewhere in the specification] are formed in said substrate to guide light between the wavelength selecting filters.”

“30. A substrate for an optical wavelength division multiplexer/demultiplexer device [multiplexer 2 shown in Figure 1 and discussed on page 11, lines 27-32 and elsewhere in the specification] comprising a plurality of alignment slots [not numbered but occupied by wavelength filters 26, 28, 30, 32, 34 & 36 shown in Figure 1 and discussed on page 12, lines 6-11 and elsewhere in the specification] for receiving a plurality of wavelength selecting filters [filters 26, 28, 30, 32, 34, 36 shown in Figure 1 and discussed on page 12, lines 6-7 and filters 26, 28, 30 shown in Figure 2 and discussed on page 13, lines 22-24 and elsewhere in the specification] and hollow core waveguides [waveguides 4 shown in Figure 1 and discussed on page 12, lines 13-25 and elsewhere in the specification] to guide light between said alignment slots wherein the arrangement provides, when appropriate wavelength selecting filters are located in said alignment slots, conversion between a combined beam [light beam 8 having wavelengths λ_1 - λ_6 shown in Figure 1 and discussed on page 11, lines 30-32 and elsewhere in the specification] comprising a plurality of wavelength channels and

a plurality of beams comprising a single wavelength channel [individual beams λ_1 , λ_2 , λ_3 , λ_4 , λ_5 , λ_6 shown in Figure 1 and discussed on page 12, lines 13-25 and elsewhere in the specification].”

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-6, 12-14, 17, 19, 22, 23 and 30 stand rejected under 35 USC §103 as unpatentable over Tu (U.S. Patent 6,219,470) in view of Miura (“Modeling and Fabrication of Hollow Optical Waveguide for Photonic Integrated Circuits”).

Claims 15 and 16 stand rejected under 35 USC §103 as unpatentable over Tu/Miura further in view of Bestwick (U.S. Patent 6,101,210).

Claim 21 stands rejected under 35 USC §103 as unpatentable over Tu/Miura further in view of Kinoshita (U.S. Publication 2002/0191907).

Claims 24, 25 and 27 stand rejected under 35 USC §103 as unpatentable over Tu/Miura further in view of Okayama (U.S. Patent 6,097,517).

VII. ARGUMENT

Appellants’ arguments include the fact that the burden is on the Examiner to first and foremost properly construe the language of the claims to determine what structure and/or method steps are covered by that claim. After proper construction of the claim language, the burden is also on the Examiner to

demonstrate where a single reference (in the case of anticipation) or a plurality of references (in the case of an obviousness rejection) teaches each of the structures and/or method steps recited in independent claims 1 and 30.

Furthermore, the Court of Appeals for the Federal Circuit has stated in the case of *In re Rouffet*, 47 USPQ2d 1453, 1458 (Fed. Cir. 1998)

to prevent the use of hindsight based on the invention to defeat patentability of the invention, this court **requires** the examiner to show a **motivation** to combine the references that create the case of obviousness. In other words, the Examiner **must show reasons** that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed. (Emphasis added).

In its recent decision, the U.S. Supreme Court in *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385 (April 2007), held that it is often necessary for a court to look to interrelated teachings of multiple patents, the effects of demands known to the design community or present in the marketplace and the background knowledge possessed by a person of ordinary skill in the art in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. The Supreme Court held that “[t]o facilitate review, **this analysis should be made explicit.**” (emphasis added) *Id.* at 1396.

The Supreme Court in its *KSR* decision also went on to say that it followed the Court of Appeals for the Federal Circuit's advice that "rejections on obviousness grounds **cannot be sustained by mere conclusory statements**; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness" (emphasis added, the Supreme Court quoting from the Court of Appeals for the Federal Circuit in *In re Kahn*, 78 USPQ2d 1329 (Fed. Cir. 2006)).

A. The Examiner continues to fail to identify any teaching in the Tu reference of the structure of a "multiplexer/demultiplexer device"

Appellants' independent claim 1 is directed to an "optical wavelength division multiplexer/demultiplexer device." The Examiner was informed in the previously filed Amendment (filed March 9, 2007) on page 8, that the Tu device, especially in the reference to Figure 3, does not teach the claimed "multiplexer/demultiplexer device."

In the Final Rejection, under the heading "Response to Arguments," the Examiner identifies portions in the abstract and in columns 1 and 2 of the Tu reference which he contends teach a "multiplexer/demultiplexer device." Again, the Examiner is simply incorrect. The abstract refers to structures "which are eventually incorporated into a multiplexer and/or a demultiplexer," but there is no disclosure of any structures which are a "multiplexer/demultiplexer," i.e., a device which can accomplish both functions. Similarly, in Tu's column 1, line 11 and column 2, lines

39-40 describes structures which are formed “as the building base for the multiplexer and/or the demultiplexer.” Again, there is no disclosure of a “multiplexer/demultiplexer device” itself – only a possible “building base” for such a device.

In the non-final and fourth Official Action, in rebuttal, the Examiner admits he relies only upon the statement in Tu that mentions a “wavelength division multiplexing transmitter and receiver.” The Examiner has ignored the §102/§103 requirement that structure which does multiplexing must be disclosed somewhere in the prior art.

In addition to not identifying any disclosure of a multiplexing device in Tu, the Examiner apparently fails to realize that the disclosed portion of the Tu reference, i.e., Figure 3, could not perform any multiplexing operation. Fig. 3 only teaches a single transmitter (laser diode 307) and receivers 310 and 311. There is no external input to the device in order to modulate the laser 307 thereby providing the required multiplexing. Instead, filter 303 and multilayered half-mirror 304 might serve to perform a demultiplexing operation, but there is no structure teaching any multiplexing operation. Again, should the Examiner believe Tu discloses any structure or combination of structures which accomplishes multiplexing as claimed, he is respectfully requested to identify that structure.

Accordingly, since the Examiner apparently still fails to appreciate that a multiplexing device required by claim 1 is simply not shown in the Tu patent, there is no basis for this claimed element being taught in the Tu reference.

B. The Examiner errs in his contention that the Figure 3 embodiment of Tu can provide any multiplexing function

In response to the Examiner's previous allegation that the Tu reference taught both multiplexing and demultiplexing, Appellants' March 9, 2007 Amendment, in the last portion of the first paragraph on page 8, pointed out that the disclosed structures in Figure 3 of the Tu patent only performed demultiplexing. Appellants' independent claim 1 requires the elements of (a) a substrate having a plurality of wavelength selecting filters and (b) hollow core waveguides formed in the substrate and (c) combined so as to provide a optical wavelength division multiplexer/demultiplexer device.

In the Response to Arguments portion of the previous Final Rejection, the Examiner does not even allege that any combination of structures in the Tu reference comprises a multiplexer and a demultiplexer. Appellants have previously noted that the Figure 3 embodiment of Tu can perform only two functions. First, it couples light from the transmitter 307 into the fiber 312 (which is neither a multiplexing nor demultiplexing structure or step). Second, it can demultiplex light received from the fiber 312 into two spectral components which are detected at 310 and 311 (clearly not a multiplexing structure or step).

Nowhere in the “Response to Arguments” portion of the non-final and fourth Official Action does the Examiner identify any structures in the Tu reference which, when combined, operate to perform the claimed optical wavelength division **multiplexing** function. The fact that the Examiner does not even allege that there are a combination of filters, waveguides, etc. in the Tu reference which comprise a multiplexer is believed to be a clear admission that they do not exist.

Should the Examiner still consider that there are some structures or structural combinations in the Tu reference that act as a “multiplexer” and in particular an “optical wavelength division multiplexer,” in order to establish a *prima facie* case of obviousness he is obligated to identify the structures and interrelationship between structures which provide the multiplexer operation.

The Examiner refers to the Tu reference at column 3, lines 7-9, column 3, line 40 to column 4, line 19 and column 5, lines 1-10, as purportedly teaching the structure of Figure 3 and Appellants do not dispute this allegation by the Examiner. However, the test is whether Tu and Fig. 3 provides any structure for **multiplexing** and in particular the claimed “optical wavelength division multiplexer/demultiplexer device” of Appellants’ independent claim 1. It does not.

The Examiner states that the cited portions of Tu “specifically performs a multiplexing function” (Official Action, page 3, first full paragraph), but does not

identify any portion of the discussion of the Tu reference which discloses any structure for performing a multiplexing function. The Examiner apparently contends that if a prior art document uses the phrase “a perpetual motion machine,” then that document itself must be a disclosure of the structure of a perpetual motion machine. This is simply erroneous.

Without disclosure of any actual multiplexer structure in the Tu reference, Tu cannot anticipate the subject matter of Appellants’ independent claims or claims dependent thereon.

The Examiner’s failure to identify any structure and structural interrelationship confirms the absence of any support for a rejection under 35 USC §103 based upon the Tu reference (it is noted that the Examiner does not contend that the secondary reference Miura (“Modeling and Fabrication of Hollow Optical Waveguide for Photonic Integrated Circuits”) teaches the missing claimed elements of a multiplexer/demultiplexer.

C. The Examiner continually refers in the “Response to Arguments” that element 304 in the Tu reference is a “wavelength filter” when in fact item 304 of Tu is indicated as being “a dielectric multi-layered half-mirror 304” (column 3, lines 52-53)

There is no indication in the Tu reference that the half-mirror 304 can or does act as a filter. Further, Tu actually does refers to a single “dielectric multilayered filter 303” (column 3, lines 49-50) but discloses only a single “filter 303.” Thus, filter 303 and half-mirror 304 are not the same structures in Tu and

are specifically described in the Tu specification as been different elements and having different functions. There is simply no support to the Examiner's contention that these are the same structure, and the Examiner's misinterpretation of Tu is clearly rebutted by the Tu reference itself. Tu fails to teach the claimed plurality of filters as contended by the Examiner.

Moreover, the Tu reference needs only a single filter 303 because the device only splits light from the fiber 312 into two spectral bands which are received at the two receivers 310 and 311. A second filter, even if disclosed and/or available, would be completely pointless in the Tu reference.

In the non-final and fourth Official Action, the Examiner attempts to defend his reference that element 304 is a "wavelength filter" even when this interpretation is contrary to the language of the Tu reference at column 3, lines 52-53. However, the Examiner concedes (in the paragraph bridging pages 3 and 4 of the Official Action) that "elements 303 and 304 of the Tu reference are not identical in nature." While the concession is appreciated, it should be understood that, as previously pointed out, element 303 is a "dielectric multilayered filter" (column 3, lines 49-50) and item 304 is a "dielectric multilayered half-mirror 304" (column 3, lines 52-53). If Tu meant to refer to two or more filters, he would have used the term "filter 304." Thus, the Tu reference cannot teach Appellants' claimed "wavelength selecting filters" because it does not teach more than a single filter.

The Examiner, in the sentence bridging pages 3 and 4 of the Official Action, appears to use a bootstrap argument for his contentions that multiplexing is performed in Tu and his speculation that the “half-mirror 304 must filter based on two operating wavelengths.”

The correct explanation of the Tu reference is that there is no multiplexing. Element 304 is a half-mirror because light from the laser diode 307 must be able to pass through it during the transmit mode and also, what is left of received light (after being filtered by the single filter 303) must be directed to receiver 310. That is why element 304 need only be a “half-mirror” and does not require any wavelength selecting (or filtering) capability.

It is only because the Examiner is attempting to find that the structure disclosed in the Tu reference performs “multiplexing” (because of the Examiner’s misuse of the word “multiplexing”), he has to interpret the half-mirror 304 as a “filter” thereby artificially creating the claimed “plurality of wavelength selecting filters” recited in the claim.

As noted previously, because the Tu reference only teaches a single “dielectric multilayered filter 303,” it does not meet the language of Appellants’ independent claim and therefore does not support any rejection under 35 USC §103. Moreover, as noted previously, Tu actually teaches away from the claim 1 combination of a “plurality of wavelength selecting filters.”

Appellants' claim requires a "substrate having a plurality of wavelength selecting filters" and because the Tu reference only teaches a single "dielectric multilayered filter 303," it does not meet the language of Appellants' independent claim and therefore does not support any rejection under 35 USC §103. In fact, Tu teaches away from the claimed plurality of filters.

D. The Examiner also fails to identify where the prior art teaches hollow core waveguides which are "formed in said substrate to guide light between the wavelength selecting filters"

All of Appellants' claims specifically recite an interrelationship between the "plurality of wavelength selecting filters" and the "hollow core waveguides." The interrelationship is to "guide light between the wavelength selecting filters." Because the Examiner cannot identify any more than a single "filter 303" in the Tu reference, there can be no waveguide which is arranged to "guide light between the wavelength selecting filters."

As noted above, the Examiner erroneously concludes that structure 304 is a wavelength selecting filter and ignores the text of the Tu reference which identifies it as a "multilayered half-mirror 304." The Examiner also ignores the fact that a second wavelength selecting filter would be pointless in Tu because there are only two spectral bands received at the two receivers 310 and 311 in the Tu device.

The Examiner still fails to identify where the claimed interrelationship between the plurality of wavelength selecting filters and the “hollow core waveguides” is disclosed in the Tu reference. The claim specifies the interrelationship as being to “guide light between the wavelength selecting filters.” The Examiner fails to identify any more than a single “filter 303” in the Tu reference and thus there cannot be a waveguide which is arranged to “guide light between the wavelength selecting filters.”

There is clearly a “hollow optical waveguide with multilayer reflectors” disclosed in Miura, but that disclosure itself does not disclose the claimed “plurality of wavelength selecting filters” or the hollow core waveguides formed in the substrate “to guide light between the wavelength selecting filters.”

Because the Examiner has made only an unsupported allegation that claimed structure is in the prior art reference, the Examiner is taken to have conceded that there is no such disclosure in the Tu or Miura references.

As a result, Tu clearly cannot teach any hollow core waveguide guiding light “between” two filters because it teaches only one filter and thus the rejection under §103 fails.

E. The Examiner erroneously contends that Tu's "optical fiber 312" serves "to guide light between the wavelength selecting filters" ("Tu teaches that light is guided from waveguides 312 between filters 303 and 304." Final Rejection, page 2)

As stated in the Tu reference, "optical fiber 312" provides an input beam to the device. However, the optical fiber ends prior to encountering single filter 303 and certainly doesn't exist between filter 303 and mirror 304 (which the Examiner contends is a filter). Therefore, even if mirror 304 were considered to be a filter (in contravention to the disclosure of the Tu reference), fiber 312 does not do any guiding of light between the wavelength selecting filters. This issue was clearly and concisely considered in the first full paragraph on page 9 of Appellants' previously filed Amendment.

Again, the Examiner's statement that "light is guided from waveguides 312 between filters 303 and 304" is a misstatement of the claim language. The claim requires hollow core waveguides "to guide light between the wavelength selecting filters" and no such structure is present in the Tu reference.

The Examiner alleges that "optical fiber 312" in Figure 3 of the Tu reference is "formed in the substrate 301" without identifying any such structure. In Tu, the conventional optical fiber 312 (not a hollow core waveguide) is placed in a V-shaped groove in the substrate and is held in place by cover 313 (column 4, line 63). Moreover, there is no evidence in Tu which suggests that the optical fiber is "formed" in the substrate as required by the claims. Thus, Tu clearly

teaches away from any “hollow core waveguides” which are “formed in said substrate to guide light between the wavelength selecting filters.”

As noted above, Tu does not teach a plurality of “wavelength selecting filters” and therefore could not possibly have a hollow core waveguide guiding light between such filters, whether or not the waveguide is “formed in said substrate.” Again, the claimed structure is simply missing from the Tu reference.

F. The Examiner fails to provide any motivation for modifying Tu or combining any additional features from the Miura reference

There must be some “reason” or “motivation” for combining references in an obviousness rejection. *In re Rouffet*. Again, as pointed out in detail in Appellants’ previously filed Amendment, the Examiner has provided no “reason” or “motivation” for combining the references.

The Examiner again attempts to rely upon his allegation of temperature insensitivity as motivation. As previously noted in Appellants’ Amendment, 3rd paragraph on page 10, the Tu reference is already temperature insensitive and therefore there would be no motivation to import the Miura hollow waveguides and their alleged “temperature insensitivity” into the Tu reference.

The Examiner continues to avoid his responsibility to establish a *prima facie* case of obviousness by identifying some “reason” or “motivation” for combining the references. Accordingly, the rejection under 35 USC §103 fails.

In the non-final and fourth Official Action, the Examiner alleges that it would be obvious to use hollow core waveguides of the Miura reference in the structure of the Tu patent to provide “temperature insensitivity.” As previously noted, the Tu reference is already temperature insensitive (see Appellants’ Amendment, page 10, 3rd paragraph) and therefore there would be no motivation to import the Miura hollow waveguides and their alleged “temperature insensitivity” into the Tu reference.

As set out by the Supreme Court in the *KSR* decision, the burden is on the Examiner (not the applicant) to provide some explicit “analysis” as to his reason or motivation for combining elements taken from several references. As noted, the Examiner has simply failed to meet his burden of providing any reason for combining portions of the Miura and Tu references, even if the Tu reference did disclose structure which is capable of multiplexing (which it clearly is not).

Accordingly, the Examiner fails to meet his burden of establishing a *prima facie* case of obviousness and the rejection under 35 USC §103 fails.

G. The Examiner’s rejection of claims 1-6, 12-14, 17, 19, 22, 23 and 30 over the Tu/Miura combination as being obvious is completely unsupported

As noted above in section A, the Examiner has failed to identify anything in the Tu reference suggesting that the structure is a multiplexer/demultiplexer device. In section B, the Examiner has failed to support his contention that Tu can provide any multiplexing function. As noted in section C, the Examiner misidentifies

element 304 in Tu as being a wavelength filter when, in fact, it is a dielectric multilayered half-mirror. As noted in section D, the Examiner has failed to identify where any prior art reference teaches hollow core waveguides which are “formed in said substrate” to guide light “between the wavelength selecting filters.” As noted in section E, the Examiner erred in contending that Tu’s optical fiber 312 serves to “guide light between the wavelength selecting filters.”

Accordingly, the claimed features of Appellants’ independent claims are simply missing from the Tu reference and there is no allegation that these missing features are disclosed in the Miura reference. Consequently, even if Tu and Miura were combined, the combination does not render obvious the subject matter of independent claims 1 or 30 or claims dependent thereon. Accordingly, the Examiner fails to establish a *prima facie* case of obviousness of claims 1-6, 12-14, 17, 19, 22, 23 and 30 over the Tu/Miura combination.

Additionally, as noted above in section F, the Examiner fails to provide any motivation for modifying the Tu reference or combining any additional features from the Miura reference. As noted above, the Supreme Court requires that the Examiner provide an explicit “analysis” pointing out how and why one of ordinary skill in the art would pick and choose elements from the cited references and then combine them in the manner of Appellants’ claims. . The Examiner has not indicated how or where the claimed elements are disclosed in the cited prior art and has certainly not indicated why one of ordinary skill in the art would pick and choose those elements

and then combine them in a manner suggested only by Appellants' independent claims.

Accordingly, the Examiner clearly fails to meet his burden of establishing a *prima facie* case of obviousness by providing the required analysis as to the rationale for combining references. Any further rejection of claims 1-6, 12-14, 17, 19, 22, 23 and 30 under 35 USC § 103 as being unpatentable over the Tu/Miura combination is respectfully traversed.

H. The Examiner's rejection of claims 15 and 16 over the Tu/Miura combination further in view of Bestwick as being obvious is completely unsupported

Inasmuch as claims 15 and 16 ultimately depend from independent claim 1, the above comments with respect to independent claim 1 being non-obvious in view of the Tu/Miura combination (see section G above) are herein incorporated by reference.

The Examiner does not allege that the Bestwick reference supplies any of the missing structures or any rationale for combining structures in the manner of Appellants' claims. Therefore, even if Tu/Miura/Bestwick were combined, the combination would still not render obvious the subject matter of claims 15 and 16 and therefore any further obviousness rejection is traversed.

Moreover, the Examiner provides a "mere conclusory statement" as to the reason for combining Bestwick with the Tu/Miura combination. This does not

meet the Supreme Court requirement of any sort of rationale as noted above in the *KSR* decision quoting the Federal Circuit decision.

Consequently, there is no *prima facie* case of obviousness of claims 15 and 16 over the Tu/Miura/Bestwick combination and any further rejection thereunder is respectfully traversed.

I. The Examiner's rejection of claim 21 over the Tu/Miura combination further in view of Kinoshita as being obvious is completely unsupported

Inasmuch as claim 21 depends from independent claim 1, the above comments with respect to independent claim 1 being non-obvious in view of the Tu/Miura combination (see section G above) are herein incorporated by reference.

The Examiner does not allege that the Kinoshita reference supplies any of the missing structures or any rationale for combining structures in the manner of Appellants' claims. Therefore, even if Tu/Miura/Kinoshita were combined, the combination would still not render obvious the subject matter of claim 21 and therefore any further obviousness rejection is traversed.

Moreover, the Examiner provides a "mere conclusory statement" as to the reason for combining Kinoshita with the Tu/Miura combination. This does not meet the Supreme Court requirement of any sort of rationale as noted above in the *KSR* decision quoting the Federal Circuit decision.

Consequently, there is no *prima facie* case of obviousness of claim 21 over the Tu/Miura/Kinoshita combination and any further rejection thereunder is respectfully traversed.

J. The Examiner's rejection of claims 24, 25 and 27 over the Tu/Miura combination further in view of Okayama as being obvious is completely unsupported

Inasmuch as claims 24, 25 and 27 ultimately depend from independent claim 1, the above comments with respect to independent claim 1 being non-obvious in view of the Tu/Miura combination (see section G above) are herein incorporated by reference.

The Examiner does not allege that the Okayama reference supplies any of the missing structures or any rationale for combining structures in the manner of Appellants' claims. Therefore, even if Tu/Miura/Okayama were combined, the combination would still not render obvious the subject matter of claims 24, 25 and 27 and therefore any further obviousness rejection is traversed.

Moreover, the Examiner provides a "mere conclusory statement" as to the reason for combining Okayama with the Tu/Miura combination. This does not meet the Supreme Court requirement of any sort of rationale as noted above in the *KSR* decision quoting the Federal Circuit decision.

Consequently, there is no *prima facie* case of obviousness of claims 24, 25 and 27 over the Tu/Miura/Okayama combination and any further rejection thereunder is respectfully traversed.

VIII. CONCLUSION

The Tu reference fails to disclose any “optical wavelength division multiplexer/demultiplexer device” (emphasis added). Tu’s half-mirror 304, which provides no frequency filtering function, is misidentified by the Examiner and there is no disclosure of more than one single filter 303. The Examiner has ignored the wording of the independent claims, i.e., “guide light between the wavelength selecting filters” and has not even indicated any structure allegedly fulfilling this function because Tu has no more than the one disclosed filter. The Examiner fails to provide any “reason” or “motivation” for combining the two references and does not rebut the clear “teaching away” (of a single filter in the Tu reference).

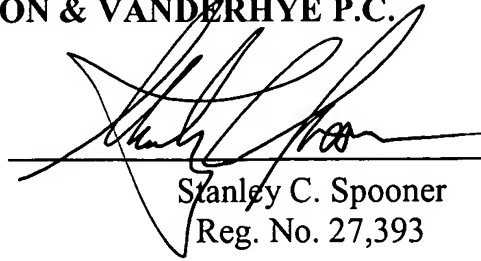
As a result of the above, there is simply no support for the rejection of Appellants' claims under 35 USC §103. Thus, and in view of the above, the rejection of claims 1-6, 12-17, 19, 21-25, 27 and 30 under 35 USC §103 is clearly in error and reversal thereof by this Honorable Board is respectfully requested.

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Respectfully submitted,

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By: _____



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SCS:kmm
Enclosure

IX. CLAIMS APPENDIX

1. An optical wavelength division multiplexer/demultiplexer device comprising:

a substrate having a plurality of wavelength selecting filters, said filters being arranged to provide conversion between a combined beam comprising a plurality of wavelength channels and a plurality of separate beams each comprising a subset of said plurality of wavelength channels, and

hollow core waveguides are formed in said substrate to guide light between the wavelength selecting filters.

2. A device according to claim 1 wherein each of said plurality of wavelength selecting filters transmit a single wavelength channel.

3. A device according to claim 1 wherein the wavelength selecting filters comprise thin film optical filters.

4. A device according to claim 1 wherein the substrate additionally comprises a plurality of alignment slots arranged to receive, in alignment, said optical filters.

5. A device according to claim 4 wherein said alignment slots comprise micro-electro-mechanical system (MEMS) structures to provide said alignment.

6. A device according to claim 1 wherein the substrate comprises at least one of a semiconductor material, silicon, silicon-on-insulator (SOI) and a silicon oxide based material.

7-11. (cancelled)

12. A device according to claim 1 wherein a base portion and a lid portion are provided to define said hollow core waveguide.

13. A device according to claim 1 wherein at least one further hollow core waveguide is provided in the substrate to guide said combined beam and/or said plurality of separate beams each comprising a subset of said plurality of wavelength channels to/from said plurality of wavelength selecting filters.

14. A device according to claim 13 wherein at least one optical fibre alignment slot is provided in said substrate, said optical fibre alignment slot being arranged to receive an optical fibre in alignment thereby enabling light to be

coupled between said optical fibre and said at least one further hollow core waveguide.

15. A device according to claims 14 wherein a mode matcher is provided to couple light between the at least one optical fibre and the at least one further hollow core waveguide.

16. A device according to claim 15 wherein the mode matcher comprises at least one of a ball lens and a GRIN lens.

17. A device according to claim 1 wherein at least one of the hollow core waveguides comprise at least one reflective element.

18. (cancelled)

19. A device according to claim 1 wherein the hollow core waveguides are dimensioned to support fundamental mode propagation.

20. (cancelled)

21. A device according to claim 1 wherein the hollow core waveguides are dimensioned to support multi-mode propagation and said wavelength selecting filters are spaced apart by the re-imaging distance.

22. A device according to claim 1 wherein said hollow core waveguides have a substantially rectangular cross section.

23. A device according to claim 1 wherein the combined beam comprises at least three wavelength channels.

24. An optical device comprising a demultiplexer stage comprising first and second devices according to claim 1, wherein said first device is arranged to receive a combined beam comprising a plurality of wavelength channels and to separate said combined beam into a plurality of beams each comprising a subset of said plurality of wavelength channels, and a multiplexer stage, wherein said second device is arranged to receive a plurality of beams each comprising a subset of said plurality of wavelength channels and to combine said plurality of beams to produce a combined beam comprising a plurality of wavelength channels, wherein at least one of the plurality of beams produced by the demultiplexer stage are routed to the multiplexer stage via an optical processor.

25. A device according to claim 24 wherein the optical processor comprises at least one of an optical amplifier and a matrix switch.

26. (cancelled)

27. A device according to claim 24 wherein the optical processor comprises a matrix switch and at least one additional wavelength channel is received by said matrix switch, said matrix switch being arranged to route said at least one additional wavelength channel to said multiplexer stage.

28-29. (cancelled)

30. A substrate for an optical wavelength division multiplexer/demultiplexer device comprising a plurality of alignment slots for receiving a plurality of wavelength selecting filters and hollow core waveguides to guide light between said alignment slots wherein the arrangement provides, when appropriate wavelength selecting filters are located in said alignment slots, conversion between a combined beam comprising a plurality of wavelength channels and a plurality of beams comprising a single wavelength channel.

31-32. (cancelled)

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X. EVIDENCE APPENDIX

None.

XI. RELATED PROCEEDINGS APPENDIX

None.